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ABSTRACT

Two measures of the "world hypotheses" of Stephen Pepper were mailed to 100 sociobiologists, 87 behaviorists, 79 personality psychologists, and 45 human developmentalists. The World Hypothesis Scale (WHS) was designed to measure Pepper's four world views: (1) formism; (2) mechanism; (3) organicism; and (4) contextualism. The Organicism-Mechanism Paradigm Inventory (OMPI) was designed to cover philosophical and practical areas. The OMPI seemed superior in validity, utility, and efficiency. Significant scale intercorrelations on the WHS indicate that it is redundant. The OMPI measures mechanism and formism at the low end and organicism and contextualism at the high end. These results suggest that social scientists' basic assumptions about human nature (whether people are active or reactive, stable or changing, purposive or without design, etc.) tend to reflect the personality traits the scientists themselves possess. A 24-item reference list and 3 data tables conclude the document. (SLD)

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Toward Valid Measurement of Stephen Pepper's World Hypotheses

Abstract

Two measures of Stephen Pepper's "world hypotheses"--Formism, Mechanism, Organicism, and Contextualism--were mailed to 100 sociobiologists, 87 behaviorists, 79 personality psychologists, and 45 human developmentalists. Significant, predictable differences among the four groups were found on both the Organicism-Mechanism Paradigm Inventory (OMPI) and World Hypothesis Scale (WHS). The OMPI seemed to have an edge over the WHS in validity and utility. Combined with data from a previous study on world views and personality, the present data indicate that social scientists' basic assumptions about human nature (whether people are active or reactive, stable or changing, etc.) tend to reflect the personality traits the scientists themselves possess.

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Toward Valid Measurement of Stephen Pepper's World Hypotheses

Philosopher Stephen Pepper's (1942) book, World Hypotheses, has over the past 35 years attracted a small, yet fervent, band of devotees. The beauty of Pepper's book lies in its simple, yet comprehensive, taxonomy of four metaphysical world views that underlie all systematic thinking. Pepper suggests that each world view is based upon a root metaphor for reality. Formism is based on similarities among events in the universe. Mechanism assumes that the universe, like a machine, consists of parts which can be understood in isolation from the whole. Organicism focuses on complex, interrelated processes that characterize living organisms. Contextualism assumes that reality is constructed by the observer, much like rope is constructed from strands of thread woven together.

Although primarily designed to be a metaphysical treatise, World Hypotheses also supports by implication the well-known fact that seems to be discussed only at cocktail parties, i.e., that different types of scientists are attracted to certain types of theorizing and research activities. It is rumored that the organismically-inclined philosopher, A. N. Whitehead once said of the mechanistically-inclined philosopher, Bertrand Russell, "Bertie says I am muddle-headed; but I say Bertie is simple-minded." Pepper's implication of a link between theoretical style and personality style eventually received support from Kuhn's (1962) now classic distinction between normal science, conducted by methodical, systematic grinds, and revolutionary science, conducted by intuitive, imaginative visionaries.

A small, yet important, research program on the psychology of the research psychologist has been maintained over the years since Pepper's book (Allport,

1955; Atwood & Tomkins, 1976; Coan, 1968, 1979; Krasner & Houts, 1984; Stolorow & Atwood, 1979; Tomkins, 1965). Only recently, however, have psychologists attempted to actually measure the relationship between attraction to Pepper's world hypotheses--Formism, Mechanism, Organicism, and Contextualism--and fundamental psychological traits (Bethel, 1974; Germer, Efran, & Overton, 1982; Harris, Fontana, and Dowds, 1977; Johnson, 1984).

Harris, et al. describe the development a World Hypothesis Scale (WHS) to measure Pepper's (1942) four world views: formism, mechanism, organicism, and contextualism. Positive results from their work include the following three findings: (1) persons sharing compatible world hypotheses experienced greater satisfaction in dyadic relationships, (2) clients who participated in psychotherapies based on world hypotheses compatible with their own perceived the therapies as more appealing, and (3) subjects endorsing different world views preferred different occupations.

The World Hypothesis Scale shows a number of weaknesses, however. All the statements assessing a particular world hypothesis end in nearly identical wording. For example, all the mechanism statements (which reflect the assumption of causality) end with, "Thus there is a specific reason for . . ." The four scales show substantial intercorrelations; for example, organicism and mechanism correlate -.60 and formism and mechanism correlate -.64. This suggests that certain world hypotheses might be better operationalized as ends of a bipolar continuum rather than as independent dimensions. The statements also appear to tap only one area, albeit a central area, in each world hypothesis.

The World Hypothesis Scale also failed to show meaningful correlations

with a battery of personality tests (Machiavellian Scale--Christie & Geis, 1970; Social Desirability--Crowne & Marlowe, 1960; Locus of Control--Rotter, 1966; and Dogmatism--Rokeach, 1960). Perhaps this is because these tests--used typically by social psychologists for narrow research purposes--are irrelevant to Pepper's constructs. In a later study (Wilson, 1980), however, all four scales on the WHS correlated essentially zero with all three scales from the Psycho-Epistemological Profile (Royce, Mos, & Kearsley, 1975).

More recently, Germer, Efran, and Overton (1982) attempted to improve upon Harris, Fontana, and Dowds's (1977) effort to operationalize Pepper's (1942) world hypotheses by constructing an Organicism-Mechanism Paradigm Inventory (OMPI). The 26 forced-choice items on the OMPI cover both philosophical areas (ontology, epistemology, image of man, analysis and causality, change, dynamics, methodology) and matters of practical concern for ordinary people (conjugal, parenting, occupational, legal, and other interpersonal relationships).

Despite the complexity and diversity of items, the scale showed good internal consistency, with a Guttman split-half coefficient of .86 and a Cronbach alpha coefficient of .76. (A three-week retest showed a stability coefficient of .77.) Thus, the format and content validity of the OMPI is an improvement over the WHS. Germer, et al found that the OMPI, like the WHS, was associated with occupational preference, but failed to correlate with scales like Locus of Control and Social Desirability. Johnson (1984) found, however, that OMPI scores showed many meaningful correlations with scales from the California Psychological Inventory (CPI; Gough, 1975), a broad-band measure of the personality spectrum. And, more recently, Nolf (1986) found OMPI scores to

follow a predictable pattern with coping styles.

Whatever the relative strengths and shortcomings of the WHS and OMPI, both have yet to demonstrate primary validity (cf. Gough, 1965)--an association between scale scores and criteria implied directly by the theory underlying the scales. In this case, the WHS and OMPI--if they validly measure world hypotheses--should predict scientists' theoretical preferences and alignment with research traditions. The present study examined the relationship between WHS and OMPI scores and the actual behavior of social scientists.

Procedures

Subjects

Subjects were chosen to represent different approaches to the study of human behavior. A sample of 100 sociobiologists was chosen by drawing names from the editorial staff of, and contributors to, the journal Ethology and Sociobiology during the period 1979-1984. In a discussion of Pepper's ideas, sociobiologist Daniel Freedman (1979, pp. 3-6) suggests that most sociobiologists lean toward organicism as a world hypothesis, although some who focus at a molecular level may be more mechanistically inclined.

A sample of 87 Skinnerian behaviorists was chosen from the editorial staff of, and list of guest editors for, The Journal of Applied Behavior Analysis, from the year 1984. According to Reese and Overton (1970), behaviorism aligns with the mechanistic world hypothesis more closely than any other modern school of thought in the social sciences.

A sample of 79 personality psychologists was chosen from the editorial masthead and list of reviewers for the personality section of the Journal of Personality and Social Psychology during the reign of section editor Robert

Hogan. Personality psychologists, who emphasize internal over external causes of behavior are typically anti-behavioristic (Note that Hogan, 1976, claims that the behavioral point of view deserves no space in a personality textbook). Personality psychologists would be expected to endorse a formism that stresses similarities among persons (providing a basis for typologies) and stability and continuity of the self (a common assumption among personologists).

Finally, a select group of 45 persons were chosen because they had in some way demonstrated publically a strong or even radical affiliation with organicism or contextualism (two world hypotheses that Pepper says are closely related). This group was more diverse than the first three and was drawn from many sources--the editorial staff of Human Development, contributors to a book honoring the organicist Heinz Werner, and an interdisciplinary department of human development, among others.

Method

In the spring of 1985 subjects were mailed a package containing a letter explaining the study, and informed consent form, a list of 8 "validity check" questions to confirm that their current self-description is congruent with their public research record, copies of the WHS and OMPI, and a posted return envelope. By November, 1985, completed questionnaires had ceased coming in, and the data from respondents were analyzed. Return rates were as follows: sociobiologists, 47/100 (47%); behaviorists, 26/87 (30%); personologists, 42/79 (53%); and human developmentalists, 19/45 (42%).

The total number of cases was reduced slightly by incomplete responses to the WHS and OMPI and by failure of subjects to describe themselves as expected on the set of validity questions. To remain in the study, subjects had to

affirm the following questions: sociobiologists: I would describe myself as an evolutionary biologist; behaviorists: I would describe myself as a behaviorist; personologist: I would describe myself as a personologist; and human developmentalist: Heinz Werner has influenced my thinking. Usable cases dropped to 39, 25, 34, and 14 for the four groups, respectively.

Several statistical analyses followed. Scores on the OMPI, four scales of the WHS, and answers to the 8 validity questions (scored no = 1, not sure = 2, yes = 3) were intercorrelated and subjected to a principle components factor analysis. Next, differences on the OMPI and four WHS scales were compared by analysis of variance. Finally, group membership was predicted by discriminant analysis, using the OMPI and WHS together and then each separately.

Results

The correlations between the OMPI and four WHS scales indicate that the the low end of the OMPI is related to the WHS Mechanism and Formism scales (*rs* of -.43 and -.24, respectively), and the high end of the OMPI is related to the WHS Organicism and Contextualism scales (*r* = .32 in both cases). These results are predictable, given that the OMPI is supposed to measure mechanism at the low end and organicism at the high end, and Pepper (1942) says that formism is related to mechanism, while organicism is related to contextualism.

The intercorrelations among the four WHS scales were also consistent with theory and past research. Mechanism and Formism correlate .27, and Organicism and Contextualism correlate .18 (all correlations significant at the .05 level with a two-tailed test). Mechanism and Formism correlate negatively with Organicism and Contextualism (all *rs* about -.60).

The principle components factor analysis of intercorrelations among the

eight validity questions, OMPI, and four WHS scales, shown in Table 1, showed five factors with eigenvalues greater than unity. The first factor appeared to be a method factor with substantial positive loadings from the OMPI, Organicism, and Contextualism, negative loadings from Formism and Mechanism, and negligible loadings from the eight validity questions. The next four factors cleanly define the four groups sampled with two validity questions loading primarily on each factor.

Insert Table 1 about here

Secondary loadings on factors 2 through 5 from the OMPI and WHS reflect the theoretical preferences of the four samples. The Personality Factor is marked by a positive loading on Formism and a negative loading on Mechanism. The Behaviorism factor has a large negative loading on the OMPI and a positive loading on Mechanism. The Sociobiology Factor is marked by a positive loading on Organicism and negative loading on Contextualism. The Human Development factor is partly defined by a positive loading on Organicism and negative loading on Formism.

Differences among the four samples on the OMPI and WHS were also found through analysis of variance. All five F ratios were significant at at least the .05 level. The details on the differences among the groups on the scales, shown in Table 2, follow the predicted patterns. Human Developmentalists scored highest on the OMPI; Behaviorists, the lowest. The Personality Psychologists received the highest scores on Formism, the Behaviorists, on Mechanism, and the Human Developmentalists on Organicism and Contextualism.

Insert Table 2 about here

A comparison of correct group classification for the three discriminant analyses can be found in Table 3. When the OMPI and four WHS scales were entered according to their ability to contribute to a significantly greater discriminating function (F=1 to enter the function), the OMPI was entered first, followed by Formism and Mechanism. The other two WHS did not meet statistical requirements for entry, apparently because of their significant inverse correlations with Formism and Mechanism. This OMPI-Formism-Mechanism function classified 37.84% of the cases correctly; the greatest misclassification was for personality psychologists (only 5.9% correct).

Insert Table 3 about here

An attempt to enter only WHS scales into a discriminant analysis again found only Mechanism and Formism contributing significantly to a discriminating function. The Mechanism-Formism function classified 39.29% of the cases correctly, but had difficulty correctly classifying the human developmentalists (0% correct). Finally, when the OMPI was used alone in a discriminant analysis, it classified 37.82% of the cases correctly, experiencing the most difficulty classifying the personologists.

Discussion

The results of the analyses above demonstrate for the first time significant primary validity for both the OMPI and WHS. Results from the

present study, coupled with results from past research, indicate that the OMPI is probably superior to the WHS in several respects. The significant scale intercorrelations on the WHS indicate that it is needlessly redundant; at most only two scales seem to sufficient to capture the variance in the WHS. The OMPI appears to be more efficient, measuring Mechanism and Formism at the low end, and Organicism and Contextualism at the high end.

Additional considerations favor the OMPI over the WHS. It is shorter and therefore takes less time to complete. From the few unsolicited negative comments from subjects, most concerned the repetitive nature and general inadequacy of the WHS. Far more incomplete WHSs were returned than incomplete OMPIs. Finally, the OMPI alone correctly classified about the same percentage of subjects as a combined OMPI-WHS function or a WHS function.

A final note concerns the utility of these analyses. These analyses do not imply that we can or should determine if some is, for example, a behaviorist by examining his or her OMPI or WHS scores. Asking a social scientist outright about his/her theoretical allegiance is easier and far more accurate than administering questionnaires. The utility of the study lies in the demonstration of links between theoretical allegiance, position on fundamental philosophical issues, and personal style.

The present data, combined with data from Johnson's (1984) paper, suggest that social scientists tend to regard other people (and the universe, for that matter) as they regard themselves. In other words, human developmentalists (organicists) regard people as active, changing, purposive, and interpersonally integrated because they tend to possess precisely those personality traits. Behaviorists (mechanists), on the other hand, regard people as reactive,

externally controlled, homeostatic (stable), and interpersonally isolated because they possess this cluster of personality traits. To paraphrase Goethe, we see the sun as the sun because the eye is sunlike.

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Table 1

Factor Analysis of Self-Descriptions and World Hypotheses Scales

Variable	Factor Loadings 1	2	3	4	5
Self-Description Validity Items					
Charles Darwin has influenced my thinking.				72	
I would describe myself as an evolutionary biologist.				80	
I would describe myself as a behaviorist.			80		
B. F. Skinner has influenced my thinking.		24	80		
I would describe myself as a personologist.		87			
Gordon Allport has influenced my thinking.		88			
I would describe myself as a systems theorist.					82
Heinz Werner has influenced my thinking.	21	24	-31		62
Organicism-Mechanism Paradigm Inventory (OMPI)	44		-54		
World Hypothesis Scale (WHS)					
Formism scale of WHS	-78	28			-31
Mechanism scale of WHS	-79	-35	20		
Organicism scale of WHS	67			25	31
Contextualism scale of WHS	83			-23	

Note. Only factor loadings greater than .20 are reported.

Table 2

Analyses of Variance for World View Scores across Subject Groups

Variable	Means and SD for Subject Groups				F Ratio
	Socbio	Behav	Person	Devel	
OMPI	N=43	N=25	N=35	N=16	F(3,115)
	18.7	14.8	18.7	23.1	16.32***
	3.3	4.1	4.4	2.0	
WHS	N=39	N=25	N=34	N=14	F(3,108)
Formism	30.0	27.7	33.0	22.4	6.54***
	7.3	9.1	7.9	6.4	
Mechanism	35.9	39.2	32.0	28.8	7.19***
	6.5	8.1	8.8	7.5	
Organicism	28.4	26.7	27.1	34.3	3.30*
	7.5	10.6	6.2	7.1	
Contextualism	25.8	26.4	27.9	34.5	3.33*
	7.9	9.4	9.6	10.5	

Note. Underlined means indicate smallest difference significant at the .05 level for a Scheffe posttest.

*p<.05

***p<.001

Table 3

Accuracy of Three Discriminant Analyses

Actual Group	Predicted Group Membership				Overall Hit Rate
	Socbio	Behav	Person	Devel	
OMPI, Formism, & Mechanism					37.84%
Sociobiologists	31.6%	23.7%	21.1%	23.7%	
Behaviorists	32.0	64.0	0.0	4.0	
Personologists	26.5	23.5	5.9	44.1	
Developmentalists	0.0	0.0	14.3	85.7	
WHS Formism & Mechanism					39.29%
Sociobiologists	15.4%	43.6%	30.8%	10.3%	
Behaviorists	12.0	68.0	12.0	8.0	
Personologists	11.8	11.8	61.8	14.7	
Developmentalists	35.7	42.9	21.4	0.0	
OMPI					37.82%
Sociobiologists	32.6%	27.9%	18.6%	20.9%	
Behaviorists	8.0	64.0	24.0	4.0	
Personologists	20.0	37.1	8.6	34.3	
Developmentalists	25.0	0.0	0.0	75.0	